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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,673	11/26/2003	Alastair Wolman	223296	8879

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LEYDIG, VOIT & MAYER, LTD.
TWO PRUDENTIAL PLAZA, SUITE 4900
180 NORTH STETSON
CHICAGO, IL 60601-6780

EXAMINER

NGUYEN, KHAI MINH

ART UNIT PAPER NUMBER

2687

DATE MAILED: 09/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/723,673	Applicant(s) WOLMAN ET AL.	
	Examiner Khai M. Nguyen	Art Unit 2687	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/26/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22-24 is/are allowed.
- 6) ☒ Claim(s) 1,3,6,8-21 and 25-36 is/are rejected.
- 7) ☒ Claim(s) 2,4,5 and 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/26/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The references listed in the Information Disclosure Statement filed on November 26, 2003 have been considered by the examiner (see attached PTO-1449 form or PTO/SB/08A and 08B forms).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 6, 8-13, 15, and 19-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Urquhart et al. (U.S.Pub-20040156339).

Regarding claim 1, Urquhart teaches in a wireless network comprising a plurality of nodes (fig.1, elements 101, 104), a method for selecting, by a first node, a channel for communicating with a second node (fig.1, abstract, paragraph 0028), the first node having at least two network interfaces with radios tuned to orthogonal channels (fig.1, abstract, paragraph 0028), the method comprising:

discovering network interfaces of the second node available for communicating with the first node (fig.3-6, paragraph 0032-0036, 0086, 0089);

with respect to each available network interface of the second node, periodically making a channel quality estimate (fig.3-6, paragraph 0032-0036, 0086, 0089); and

making a channel selection (fig.3-6, paragraph 0032-0036, 0086).

Regarding claim 3, Urquhart teaches the method of claim 1 wherein discovering available network interfaces is in accordance with a protocol (fig.3-6, paragraph 0032-0036, 0086, 0089), and wherein discovering available network interfaces further comprises discovering whether the second node is capable of operating in accordance with the protocol (fig.3-6, paragraph 0032-0036, 0086, 0089).

Regarding claim 6, Urquhart teaches the method of claim 1 wherein making a channel quality estimate comprises:

sending a probe message along the network interface (fig.3-6, paragraph 0086, 0089); receiving a response to the probe message from the second node (fig.3-6, paragraph 0086, 0089-0090); and

calculating a round-trip latency time associated with sending the probe message and receiving the response (fig.3-6, paragraph 0086, 0089-0090).

Regarding claim 8, Urquhart teaches the method of claim 6 wherein the probe message is assigned a highest scheduling priority level so that the probe message may be transmitted ahead of other packets (fig.3-6, paragraph 0093-0095).

Regarding claim 9, Urquhart teaches the method of claim 8 wherein the network interface is conformant to IEEE standard 802.11e (paragraph 0072).

Regarding claim 10, Urquhart teaches the method of claim 1 wherein making a channel selection is performed at a time determined by a randomized interval (paragraph 0096).

Regarding claim 11, Urquhart teaches the method of claim 1 wherein making a channel selection comprises

selecting a channel associated with a network interface of the second node having a best channel quality estimate (fig.3-6, paragraph 0093).

Regarding claim 12, Urquhart teaches the method of claim 1 wherein making a channel selection comprises:

if a first network interface of the second node has a channel quality estimate that is preferable to channel quality estimates of other network interfaces of the second node (fig.3-6, paragraph 0093-0094), and if the channel quality estimate of the first network interface provides an improvement, above a threshold (fig.3-6, paragraph 0093-0094), over the channel quality estimate of a currently-selected network interface of the second node, selecting the first network interface (fig.3-6, paragraph 0093-0095); and

otherwise retaining the currently-selected network interface (paragraph 0095).

Regarding claim 13, Urquhart teaches the method of claim 1, further comprising:

making at least one additional channel selection (paragraph 0021, 0092),

wherein communicating with the second node comprises striping data among selected channels (paragraph 0093-0095).

Regarding claim 15, Urquhart teaches the method of claim 1 wherein the wireless network is a multi-hop network, an ad hoc network, an infrastructure network or a wireless community network (paragraph 0098).

Regarding claim 19, Urquhart teaches the method of claim 1 wherein one or more network interfaces in the wireless network conform to IEEE standard 802.11, IEEE

standard 802.11a, IEEE standard 802.11b, or IEEE standard 802.11g (paragraph 0072).

Regarding claim 20, Urquhart teaches computer-readable media storing one or more modules comprising a driver that implements a method for selecting a channel for wireless communication from a first device to a second device (fig.1, abstract, paragraph 0028), the first device having at least two network interfaces comprising radios tuned to orthogonal channels (fig.1, abstract, paragraph 0028), the method comprising:

discovering available network interfaces of the second device (fig.3-6, paragraph 0032-0036, 0086, 0089);

with respect to each available network interface of the second device, periodically making a channel quality estimate (fig.3-6, paragraph 0032-0036, 0086, 0089); and

making a channel selection (fig.3-6, paragraph 0032-0036, 0086, 0089).

Regarding claim 21, Urquhart teaches the computer-readable media of claim 20 wherein the driver is an operating system kernel-mode driver (paragraph 0084).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14, 16-18, and 25-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Urquhart et al. (U.S.Pub-20040156339) in view of Benveniste (U.S.Pub-20030174690)

Regarding claim 14, Urquhart teaches the method of claim 1.

Urquhart fails to specifically disclose the communicating with the second node comprises forwarding a packet received from a third node. However, Benveniste teaches a dynamic band-width allocation scheme to promote fair access to the channel for all co- channel cells. It enables the success rate of a cell in accessing it's assigned channel to be independent of it's location, assuming comparable traffic loads. Benveniste teaches the communicating with the second node comprises forwarding a packet received from a third node (fig.7, paragraph 0082-0083). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use communicating with the second node comprises forwarding a packet received from a third node as taught by Benveniste with Urquhart teaching in order to provide

channel selection in WLAN networks must be accompanied by dynamic band-width allocation in order to avoid interference between co-channel cells.

Regarding claim 16, Urquhart teaches the method of claim 1.

Urquhart fails to specifically disclose the wireless network is linked to a second network. However, Benveniste teaches a dynamic band-width allocation scheme to promote fair access to the channel for all co-channel cells. It enables the success rate of a cell in accessing it's assigned channel to be independent of it's location, assuming comparable traffic loads. Benveniste teaches the wireless network is linked to a second network (fig.7, paragraph 0082-0083). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the wireless network is linked to a second network as taught by Benveniste with Urquhart teaching in order to provide channel selection in WLAN networks must be accompanied by dynamic band-width allocation in order to avoid interference between co-channel cells.

Regarding claim 17, Benveniste, and Urquhart further teaches the method of claim 16 wherein the second network is a wired network (see Benveniste, fig.7, paragraph 0082-0083).

Regarding claim 18, Benveniste, and Urquhart further teaches the method of claim 16 wherein the second network is a wide-area network (see Benveniste, fig.7, paragraph 0082-0083).

Regarding claim 25, Urquhart teaches a device for deploying as a node in a wireless network (fig.1, abstract, paragraph 0028), comprising:

a plurality of wireless network interface cards (paragraph 0046-0049, 0067);

Urquhart fails to specifically disclose a network protocol stack comprising a plurality of layers; and a virtual layer within the network protocol stack and above the plurality of wireless network interface cards, the virtual layer presenting a single network interface to higher layers in the network protocol stack. However, Benveniste teaches a dynamic band-width allocation scheme to promote fair access to the channel for all co-channel cells. It enables the success rate of a cell in accessing it's assigned channel to be independent of it's location, assuming comparable traffic loads. Benveniste teaches a network protocol stack comprising a plurality of layers (paragraph 0015, 0029); and a virtual layer within the network protocol stack and above the plurality of wireless network interface cards (paragraph 0015, 0029), the virtual layer presenting a single network interface to higher layers in the network protocol stack (paragraph 0029, 0035, 0066). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a network protocol stack comprising a plurality of layers; and a virtual layer within the network protocol stack and above the plurality of wireless

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network interface cards, the virtual layer presenting a single network interface to higher layers in the network protocol stack as taught by Benveniste with Urquhart teaching in order to provide channel selection in WLAN networks must be accompanied by dynamic band-width allocation in order to avoid interference between co-channel cells.

Regarding claim 26, Benveniste, and Urquhart further teaches the device of claim 25 wherein the wireless network interface cards comprise radio transceivers tunable to orthogonal frequency channels (see Benveniste, paragraph 0015).

Regarding claim 27, Benveniste, and Urquhart further teaches the device of claim 25 wherein the device can be used to forward data from a first wireless network node to a second wireless network node (see Urquhart, fig.3-6, paragraph 0032-0036, 0086, 0089).

Regarding claim 28, Benveniste, and Urquhart further teaches the device of claim 25 wherein the virtual layer is implemented as a data link layer protocol (see Benveniste, paragraph 0015, 0029).

Regarding claim 29, Benveniste, and Urquhart further teaches the device of claim 25 wherein the virtual layer is situated below a network layer of the network protocol stack (see Benveniste, paragraph 0015, 0029).

Regarding claim 30, Benveniste, and Urquhart further teaches the device of claim 25 wherein one or more wireless network interface cards conform to IEEE standard 802.11 (see Urquhart, paragraph 0072).

Regarding claim 31, Benveniste, and Urquhart further teaches the device of claim 25 wherein one or more wireless network interface cards conform to IEEE standard 802.11b (see Urquhart, paragraph 0072, see Benveniste, paragraph 0015).

Regarding claim 32, Benveniste, and Urquhart further teaches the device of claim 25 wherein one or more wireless network interface cards conform to IEEE standard 802.11a (see Urquhart, paragraph 0072, see Benveniste, paragraph 0015).

Regarding claim 33, Benveniste, and Urquhart further teaches the device of claim 25 wherein one or more wireless interface cards conform to IEEE standard 802.11g (see Urquhart, paragraph 0072, see Benveniste, paragraph 0015).

Regarding claim 34, Benveniste, and Urquhart further teaches the device of claim 25 wherein the device is deployable as a node in any one of a multi-hop network, an ad hoc network, an infrastructure network, a wireless mesh network or a wireless community network (see Urquhart, paragraph 0098).

Regarding claim 35, Benveniste, and Urquhart further teaches the device of claim 34 wherein the device is deployable as a mesh router (see Urquhart, paragraph 0023-0024).

Regarding claim 36, Benveniste, and Urquhart further teaches the device of claim 25 wherein the device is deployable as a node in a wireless network that is linked to a second network (see Urquhart, paragraph 0032-0036, 0086).

Allowable Subject Matter

4. Claims 2, 4-5, 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
5. Claims 22-24 are allowed.

Regarding claim 22: The following is an examiner's statement of reasons for allowance: Prior art teaches a computer-readable medium on which is stored a data structure for use by a first wireless network node in selecting a channel for transmitting data to a second wireless network node in accordance with a protocol. However, the prior art fails to teaches a data field for identifying the second node; a data field for indicating whether the second node is known to use the protocol; a data field for storing a physical address associated with each known network interface of the second node; a data field for storing a channel quality estimate associated with each known network interface of the second node; a data field for identifying a current preferred channel for transmitting data to the second node; a data field for recording a most recent time at which a channel was selected; a data field for recording a most recent time at which a message was either sent to or received from the second node; and a data field for storing times associated with unacknowledged messages.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Citation of Pertinent Prior Art

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Melpignano (U.S.Pub-20050176473) discloses Internet protocol based wireless communication arrangements.

Viswanath et al. (U.S.Pat-6694147) discloses methods and apparatus for transmitting information between a basestation and multiple mobile station.

Hosur et al. (U.S.Pat-6917311) discloses orthogonal preamble encoder, method of encoding orthogonal preamble and multiple-input, multiple-out communication system employing the same.

Troulis (U.S.Pub-20040233839) discloses method and apparatus for channel estimation in a packet based transmission system having reduced complexity.

Mahany (U.S.Pub-20040042421) discloses Local area network having multiple channel wireless access.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khai M. Nguyen whose telephone number is 571.272.7923. The examiner can normally be reached on 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on 571.272.7922. The fax phone number for the organization where this application or proceeding is assigned is 571.273.8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Khai Nguyen
Au: 2687

8/25/2005


9/6/05
LESTER G. KINCAID
SUPERVISORY PRIMARY EXAMINER